WHAT IS CLAIMED IS:

1. A method for producing a fucosylated glycoprotein, the method comprising:

contacting a recombinant fucosyltransferase protein with a mixture comprising a donor substrate comprising a fucose residue, and an acceptor substrate on a glycoprotein, under conditions where the fucosyltransferase catalyzes the transfer of the fucose residue from a donor substrate to the acceptor substrate on the glycoprotein, thereby producing a fucosylated glycoprotein,

wherein the recombinant fucosyltransferase protein comprises a polypeptide having greater than 90% identity to an amino acid sequence selected from the group consisting of SEQ ID NO:2, 4, 6, and 8.

2. The method of claim 1, wherein the polypeptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 2, 4, 6, and 8.

3. The method of claim 1, wherein the polypeptide comprises SEQ ID NO: 2.

4. The method of claim 1, wherein the polypeptide further comprises an amino acid tag.

5. The method of claim 1, wherein the method further comprises a step of purifying the fucosylated glycoprotein.

6. The method of claim 1, wherein the acceptor substrate is a glucose residue, and wherein the recombinant fucosyltransferase protein comprises a polypeptide having greater than 90% identity to SEQ ID NO:6.

7. The method of claim 1, wherein the acceptor substrate is an N-acetylglucosamine residue, and wherein the recombinant fucosyltransferase protein comprises a polypeptide having greater than 90% identity to an amino acid sequence selected from the group consisting of SEQ ID NO:2, 4, and 8.

8. The method of claim 1, wherein an acceptor substrate on the glycoprotein comprises Galβ1-OR, Galβ,3/4GlcNAc-OR, NeuAcα2,3Galβ1,3/4GlcNAc-Or,

wherein R is an amino acid, a saccharide, an oligosaccharide, or an aglycon group having at least one carbon atom.